SUBACROMIAL IMPINGEMENT SYNDROME RELATED TO SCAPULAR DYSKINESIS: A CASE REPORT

By

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In partial fulfillment of the
requirements for the course:
PT 7243 Evidence-Based Practice Seminar II
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September, 2021

Abstract

Background and Purpose: Chronic scapular dyskinesis is believed to have caused subacromial impingement syndrome (SAIS) in this patient. The focus of this case report is to see how scapular-focused interventions can be used in the treatment of SAIS, and how the literature of these interventions to an acute population can also be applied to a chronic population.

Case Description: The patient comes to physical therapy because he is unable to perform his normal work-related tasks without pain. The patient performs repetitive lifting, pushing and pulling, and repetitive overhead reaching and stowing of boxes at work. Initial examination reveals a mispositioned scapula, faulty scapulohumeral kinematics, and pain and weakness with resisted external rotation, flexion, and abduction of the shoulder. Plan of care focuses on scapular stability interventions to bring the scapula to an anatomically correct resting position and decrease the pain the patient is experiencing related to SAIS.

Outcomes: The patient regains near full range of motion of the right shoulder and can safely perform work-related activities with decrease in pain. Muscle strength of the rotator cuff and periscapular muscles is improved, but there remains room for more progress in the future.

Discussion: Scapular-focused interventions can help decrease pain and improve daily function in patients with SAIS. Future research can focus on long-term outcomes and compare outcomes of acute SAIS conditions with chronic SAIS conditions.

Key Words: “Subacromial impingement syndrome”, “scapular-focused interventions”

Introduction

Subacromial impingement syndrome (SAIS) is a term used to describe compression and damage to contractile tissues within the space between the acromion process and the humeral head.[1] It can be caused by a variety of factors, such as tendon changes, impaired scapulothoracic motion and stability, or overuse. Impingement syndromes can be classified as internal, producing pain in the posterior shoulder region, or external, producing pain in the anterior/lateral shoulder region. They can also be classified as primary or secondary. Primary impingement syndrome is a result of congenital defects such as having a hooked acromion, and secondary impingement can be due to faulty scapulothoracic kinematics or poor muscular control. Common signs and symptoms of SAIS include weakness of the shoulder musculature, pain in the internal or external impingement pattern, and range of motion impairment. One of the most common aggravating activities for patients with SAIS is overhead activity because this amount of shoulder flexion significantly decreases the subacromial space.[1]

The patient in this case report is unique because he has been predisposed to SAIS from a previous injury but did not become symptomatic until nearly two decades later. The chronicity of his condition trained his shoulder to move with significant dyskinesis and malposition of the scapula, and this is believed to have anteriorly tilted his acromion which leads to a decrease in the subacromial space and an increased likelihood of impingement.

Case Description

The patient is a 50-year-old Caucasian male who is referred to physical therapy following an injury to the right shoulder during work. The patient has a history of a previous shoulder injury approximately 17 years ago when working as a CNA. He was assisting in lifting a patient when the other helper lost their grip and the case study patient had to quickly adjust his arms so the patient that was being transferred did not fall. This shoulder injury was not followed with PT. The patient is 5 ft 6 in and weighs 212 lbs (BMI 34.22 kg/m^2). His blood pressure is 122/84 with a heart rate of 77 bpm. The patient is currently taking Cymbalta, gabapentin, Protonix, Trazodone HCl, Etodolac, B12 supplement, and alpha-lipoic acid. The patient is currently employed as a receiving associate with Amazon and working part-time for Pizza Hut.

The patient was stowing a box overhead and while holding the box overhead he pushed it in to place and felt a "pop" in the anterior compartment of his shoulder. The patient immediately had pain in the anterior right shoulder that is described as "sharp" and rated on a Numeric Pain Rating Scale (NPRS) as an 8/10. The injury occurred on 06/06/2021 and the patient was seen by a physician at Concentra Urgent Care on 06/15/2021. The patient was not seen in PT until the initial evaluation on 06/28/2021 and was on lifting restrictions at work during treatment so he could not perform any overhead lifting or moving. His chief complaint is there is a sharp pain in his shoulder with certain movements. Exacerbating movements include lifting objects, "twisting" (rotation) of the right arm and reaching overhead. Temporary relieving factors include ice, rest, muscle relaxer.

Examination

Upon arrival to physical therapy, the patient presents with mild forward head and moderate rounded shoulders in resting position, along with internal rotation of the humerus bilaterally. Observations of the back include mild thoracic kyphosis and a winging of the right scapula. There is mild audible "clicking" in the right shoulder with circular movement of the humerus. When asked to stabilize the scapula, the patient has severe accessory muscle engagement. Palpation displays a mild elevation of the right first rib, and the right scapula is moderately elevated, abducted, and mildly anteriorly tilted. Radiograph is negative for any fractures.

The patient is given a Shoulder Pain and Disability Index (SPADI) Questionnaire[2] and a Fear-Avoidance Beliefs Questionnaire (FABQ)[3] prior to the start of the initial evaluation. The SPADI initial score is 15/130 which is indicative of 11% disability, and the initial FABQ total is 42/72 where the patient scored 12/24 in the physical activity (FABQ-PA) section and 30/48 in the work (FABQ-W) section. Lateral scapular slide measurements taken from the spinous process of T6 to the medial scapular border measured 10 cm on the right side.[4] The patient rates pain 8/10 on the Numeric Pain Rating Scale (NPRS).[5]

Initial range of motion measurements taken with a goniometer can be found in table 1, and manual muscle test (MMT) values in table 2.[6] The patient can complete full range of motion in forward shoulder flexion, but experiences pain while performing the movement. Limitations are noted in shoulder extension, shoulder internal and external rotation, and shoulder abduction.[7] Special tests performed can be found in table 3. It should be noted that Hawkins-Kennedy, empty can test, painful arc, and resisted external rotation are included in a test cluster where ≥3 positive tests has a specificity of 74 for a diagnosis of subacromial impingement syndrome.[8]

Following the initial examination, the patient is suspected of having subacromial impingement syndrome (SAIS). The patient's poor posture and the prolonged malposition of his scapula are suspected of being the cause of this PT diagnosis. Prior to leaving the clinic, the patient is educated on being more aware of his posture during home and leisure activities, specifically not allowing his shoulders to stay in an elevated position while performing household tasks and riding his motorcycle. The patient is motivated to get back to work without restrictions, and a lack of comorbidities both indicate a good patient prognosis.

Intervention

Treatment types include manual therapy, therapeutic exercise, neuromuscular reeducation, and therapeutic activity. Treatment was focused on scapular stabilization to retract the scapula at rest and focus on opening the subacromial space to decrease the chance of impingement with any overhead reaching activities. Hotta et. al. conducted a study in 2018 performing therapeutic exercises focused on periscapular muscles to improve scapular dynamics and found this method to be clinically supported.[9] Among the exercises they performed were scapular punches, horizontal rowing, and side-lying shoulder external rotation paired with abduction. Ravichandran et. al. conducted a systematic review of 7 studies ranging from 2010-2019 covering 228 patients. They found there is "sufficient evidence to suggest that scapular stabilization exercises offer effectiveness in reducing pain and disability among subjects with subacromial impingement syndrome".[10] In a systematic review and meta-analysis, Saito, Harrold, Cavalheri, and McKenna support scapular focused interventions can improve short-term pain and function.[11]

Based on the evidence, interventions can be found in table 4. Initial interventions are modified due to an overestimation of the patient's strength in a pain-free range. Scapular PNF tracking allows the patient to feel how a scapula moves in proper alignment, and initiates retraining of the movement pattern when the patient is asked to actively contract periscapular musculature and assist in the movement. Posterior mobilization of the humeral head is performed to help facilitate the humeral head moving posteriorly. The patient requires verbal cueing during resistance activities to prevent shoulder elevation.

Outcomes

The patient's presents with improved posture since the initial visit, indicating adherence to home exercise program. Adherence is also seen in the decrease in verbal cueing to keep the shoulders from elevating with activity. The patient can safely perform work activities with decreased pain, so he is discharged from care one appointment early, per his request. Patient range of motion outcomes can be found in table 1 and MMT outcomes in table 2. Both areas display improvement in general use and with functional work-specific tasks. The patient's SPADI score improved to 14/130, FABQ-PA improved to 9/24, FABQ-W improved to 18/48, and the NPRS improved to 5/10 pain at worst, and 3/10 pain constantly.

Discussion

Some of the same exercises performed by Hotta et. al. have been included in this plan of care, and some have changed. Overall, the focus of scapular-specific exercises remains the same. This focus to the plan of care provides a decrease to the patient's pain and enables the patient to return to work without restrictions. This patient differs slightly from the literature in that his condition is more chronic than acute. His history of a previous shoulder injury was not followed up with physical therapy, meaning his shoulder has been moving in a dysfunctional pattern for 17 years.

Since this patient comes to PT under workers compensation, a weakness of the case is he is initially authorized only six visits. Additional visits are requested following visit five because the patient neglects to show significant changes in the neuromuscular retraining of proper scapulohumeral rhythm. A chronic condition cannot be completely resolved with one month of physical therapy, so the patient's management of his impingement is dependent upon his upkeep with exercises and his ability to continue to correct his posture.

Improvements in the patient's range of motion and strength agree with the literature, subacromial impingement syndrome can be treated with a focus on retraining and strengthening of the periscapular region. Future research can look at how this type of training program can affect a patient long-term and can also look at how scapular-focused interventions might be considered for future chronic shoulder conditions.

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Tables and Figures

	Flexion	Extension	Rotation	Abduction
Initial	180 deg	15 deg	Internal: 50 deg External: 80 deg, painful	130 deg
Final	180 deg	25 deg	Internal: 60 deg External: 90 deg	180 deg

Table 1. Range of motion measurements of the right shoulder.

	Flexion	Extension	Rotation	Abduction	Rhomboid	Trapezius
Initial	4-/5	3+/5	Internal: 4/5 External: 5/5, painful	3-/5	3/5	Upper: 3/5 Middle: 3/5
Final	4+/5	4/5	Internal: 4/5 External: 5/5	4/5	4+/5	Upper: 4+/5 Middle: 4/5

Table 2. Manual muscle test values of the right shoulder.

Positive	Hawkins-Kennedy Empty can test Painful arc Resisted external rotation
Negative	Resisted internal rotation Apprehension test Lift-off test Drop arm test (painful)

Table 3. Special tests performed on the patient at the initial evaluation.

	Therapeutic Exercise and Neuromuscular Reeducation	Manual Therapy	Therapeutic Activities
Day 1	Seated scapular pinches x 20	None	None

Day 2	Wall Angel wings x 20 Shoulder shrug on wall x 20 Doorway pectoral stretch with 10 sec hold x 3	PNF Scapulohumeral tracking followed by active contraction x 40	None
Day 3	Shoulder shrug on wall x 20 Sidelying ER with towel and 5# dumbbell 2 x 10 Standing resisted shoulder ER with blue TB 2 x 15 Standing resisted shoulder ABD with blue TB 3 x 15 A pulls with blue TB 3 x 15 W pulls with blue TB 3 x 15 Prone scapular pinches bilateral x 20 Chin tucks x 20	None	None
Day 4	W pulls with green RB 3 x 20 Standing row pull with green RB 3 x 20 Standing resisted shoulder ER with blue TB 3 x 15 Standing resisted shoulder ABD with blue TB 3 x 15 Prone scapular pinches bilateral x 20	Posterior shoulder mobilization x 60	None
Day 5	Standing resisted shoulder ER with blue TB 3 x 15 W pulls with green RB 3 x 15 Standing row pull with green RB 3 x 15 Mobilization with movement resisted shoulder ABD with blue TB 3 x 15 Mobilization with movement shoulder flexion with 6# bar 3 x 15	Posterior shoulder mobilization x 60	None

Day 6	Shoulder shrug on wall x 20 Standing roll shoulder back and push up on table 3 x 8 Standing resisted shoulder ER at 0 ABD with black TB 2 x 15 Standing resisted shoulder ER at 90 deg ABD with green TB 2 x 12 W pulls with green RB 3 x 15	None	None
Day 7	Shoulder shrug on wall x 20 Standing roll shoulder back and push up on table 3 x 15 W pull with teal RB 3 x 15 Standing row pull with supination with green RB 3 x 15 Standing resisted shoulder ER at 90 deg shoulder ABD with 3# dumbbell 3 x 15	None	None
Day 8	W pull with teal RB 3 x 15 Standing row pull with supination with green RB 3 x 15 Standing resisted shoulder flexion with blue TB 3 x 15 Resisted shoulder ABD with blue TB 3 x 15 Trampoline ER throw with red ball 3 x 12	None	Lift and carry 25# from 32-inch shelf 2 x 2 min
Day 9	Standing resisted shoulder flexion with blue TB 3 x 15 Standing resisted shoulder ABD with blue TB 3 x 15 Trampoline ER throw with yellow ball 3 x 15 Overhead lift 12# bar 3 x 12	None	Lift and carry 35# from 32-inch shelf 3 x 3 min Push/pull 90# sled 3 x 3 min
Day 10	Overhead lift 24# bar 3 x 15 Cross body chop and reverse chop with 10# kettlebell 3 x 10 each side W pull with red RB 3 x 12	None	Lift and carry 25# from 42-inch shelf 3 x 3 min

Day 11	Overhead lift 12# bar 3 x 15	None	Lift and carry 40# 20 feet 3 x 3 min Lift and carry 30# from 51-inch shelf 3 x 3 min

Table 4. A day-by-day break down of the interventions provided to the patient.